

REMARKS

Status of Application

Claims 1-5 and 8-30 were pending in the application. By this amendment, claims 31-33 are added. Thus, the status of the claims is as follows:

Claims 9-29 are withdrawn from consideration.

Claims 1-5, 8, and 30 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

Claim 1 and 30 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,176,990 B1 to Yager et al. ("Yager").

Claims 1, 8, and 30 are rejected under 35 U.S.C. § 103(a) as being unpatentable over PCT Publication No. WO 98/28604 to Fuhr ("Fuhr") in view of PCT Publication No. WO 96/13744 to Günther ("Günther").

Claims 2-4 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yager in view of U.S. Patent No. 5,876,675 to Kennedy ("Kennedy").

Claims 2-4 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yager in view of U.S. Patent No. 5,599,503 to Manz et al. ("Manz") and U.S. Patent No. 5,296,375 to Kricka et al. ("Kricka").

Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yager in view of either U.S. Patent No. 6,091,502 to Weigl et al. ("Weigl") or Swerdlow et al. "Three DNA Sequencing Methods Using Capillary Gel Electrophoresis and Laser-induced Fluorescence" ("Swerdlow").

Claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yager in view of Manz.

New Claims

This preliminary amendment adds new claims 31-33. Support for claim 31 is found in the specification at page 7, line 9 – page 14, line 24, and FIGs. 2-4. Support for claim 32 is found in the specification at page 13, line 24 – page 14, line 5. Support for claim 33 is found in the specification at page 14, lines 15-24. Thus, new claims 31-33 do not introduce any new matter. None of the cited references disclose or suggest at least “a light guide for guiding a light from an external light source to a prescribed area of the channel, a light-emitting surface of the light guide being a portion of a first side surface of the channel,” a limitation of claim 31. Because none of the cited references discloses this limitation of claim 31, claim 31 is considered both unanticipated and nonobvious over the cited references. Claims 32 and 33 are considered unanticipated and nonobvious for at least the reason of their dependence from claim 31.

35 U.S.C. § 112 Rejection

The rejection of claims 1-5, 8, and 30 under the first paragraph of 35 U.S.C. § 112 as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention, is respectfully traversed based on the following.

Claim 1 is rejected for its limitation that requires the “second electrode [be] provided on a lower surface of said channel in a position at least partially opposite said first electrode.” The Office Action asserts that Fig. 3 discloses the second electrode 45 is positioned opposite the first electrode 44 and that there is no disclosure to support the “partially opposite” limitation of claim 1. In fact, Fig. 3 does disclose that the second electrode is “partially opposite” the first electrode. In particular, Fig. 3 shows the second

electrode to be opposite only the left-most portion of the first electrode. If the second electrode were not “partially opposite” the first electrode, but rather “completely opposite” the second electrode, the second electrode would block the condensing optical element 26 illustrated in Fig. 3. Blocking the condensing optical element would obviously defeat the purpose of the invention. Therefore, the claim limitation requiring the second electrode be “at least partially opposite said first electrode” is accurate and is supported by Fig. 3 of the present specification. For this reason, Applicant asserts that claim 1 includes material that is described in the specification in such a way as to enable one of skill in the art to make and/or use the invention of claim 1. As claim 1 is considered to be enabled, claims 2-5, 8, and 30 are similarly considered enabled.

Accordingly, it is respectfully requested that the rejection of claims 1-5, 8, and 30 under the first paragraph of 35 U.S.C. § 112 as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention, be reconsidered and withdrawn.

35 U.S.C. § 102(e) Rejection

The rejection of claims 1 and 30 under 35 U.S.C. § 102(e) as being anticipated by Yager, is respectfully traversed based on the following.

For the Examiner’s convenience, the text of claim 1 is provided below:

1. A microchip comprising:
 - a channel having at least one internal surface, wherein an object to be analyzed is capable of traveling through said channel; and
 - an optical element facing said channel to receive a light from said object, said optical element having a surface forming a part of said at least one internal surface of said channel,
 - said microchip further comprising, as deflecting elements for approximating said object in said channel to said optical element:

a first electrode provided to face said channel at a vicinity of said optical element, said first element provided on an upper surface of said channel; and

a second electrode provided to face said channel at an upstream side of said optical element with respect to a traveling direction of said object, said second electrode provided on a lower surface of said channel in a position at least partially opposite said first electrode,

wherein said object is capable of being approximated to said optical element in a direction transverse to a length of said channel by applying a predetermined electric field between said first and second electrodes.

Of particular interest to the current Office Action are the limitations relating to the optical element and the first and second electrodes. With respect to these elements, the second electrode is “provided to face said channel at an upstream side of said optical element,” *emphasis added*. Furthermore, “by applying a predetermined electric field between said first and second electrodes” the object to be sensed is “approximated to said optical element in a direction transverse to a length of said channel,” *emphasis added*.

In contrast, Yager does not disclose a second electrode “provided to face said channel at an upstream side of said optical element.” The Office Action asserts that Yager’s substrate, as found in Figs. 5 and 7, “reads on the claimed ‘optical element.’” However, if Yager’s substrate is to read on the optical element, none of Yager’s electrodes 402 can correspond to the second electrode of claim 1. For Yager’s substrate to be the optical element, the second electrode of claim 1 would need to be upstream of the substrate. But Yager does not illustrate any electrodes that are upstream of the substrate. Indeed, the electrodes would need to be floating in “space” external to the substrate to satisfy this limitation of claim 1, which is clearly not disclosed or suggested by Yager. Thus, Yager fails to disclose at least the limitation of a second electrode “provided to face said channel at an upstream side of said optical element,” and therefore Yager cannot anticipate claim 1.

Furthermore, Yager does not disclose applying an electric field between its electrodes such that an object is “approximated to said optical element in a direction

transverse to a length of said channel.” The purpose of the electrodes illustrated in the two substrate embodiment of Fig. 5 is explored in Figs. 9A-C, and explained at column 11, lines 8-23. In particular, an electric field is applied to the electrodes and the sample separates into species with the result that “the smallest fragments mov[e] the fastest,” column 11, lines 17, 18. As shown in Fig. 9B, these species have moved in a direction parallel to the length of the channel, not transverse as required by claim 1. As shown in Fig. 9C, the species may be further separated by applying a different electric field to the electrodes. The result is still the same in that the species are moved in a direction parallel to the length of the channel, not transverse as required by claim 1. Thus, Yager fails to disclose at least a second limitation of claim 1, and therefore cannot anticipate claim 1.

In sum, Yager fails to disclose at least two limitations of claim 1 and thus Yager cannot anticipate the apparatus of claim 1. Claim 30 depends from claim 1 and is unanticipated by Yager for at least the same reasons as claim 1.

Accordingly, it is respectfully requested that the rejection of claims 1 and 30 under 35 U.S.C. § 102(e) as being anticipated by Yager et al, be reconsidered and withdrawn.

35 U.S.C. § 103(a) Rejections

The rejection of claims 1, 8, and 30 under 35 U.S.C. § 103(a), as being unpatentable over Fuhr in view of Günther, is respectfully traversed based on the following.

As noted in the Office Action itself, “Fuhr does not explicitly disclose an optical element as claimed, or structure corresponding to the limitations pertaining to this element.” For this reason, the Examiner raises the combination of Fuhr and Günther. To this end, the Office Action asserts the wall between aperture 4 and channel 2 directly above detector 5 is an optical element. This wall is a planar piece of a silicon substrate as disclosed in column 7, line 67 of Günther. One of ordinary skill in the art would not consider a flat piece of silicon to be an optical element for a number of reasons. First,

silicon does not transmit visible light, thus, the asserted wall cannot be an optical element. Second, one of ordinary skill in the art would assume that an optical element would have optical power. For example, the optical element in the present application is disclosed to be a condensing optical element, which clearly has optical power. In Günther, the planar wall between the aperture and channel will not have any optical power. Thus, the combination of Fuhr and Günther does not disclose or suggest an optical element as required by the invention of claim 1 and therefore cannot render obvious the invention of claim 1. As claims 8 and 30 depend from nonobvious claim 1, claims 8 and 30 are nonobvious for at least the same reasons.

Accordingly, it is respectfully requested that the rejection of claims 1, 8, and 30 under 35 U.S.C. § 103(a) as being unpatentable over Fuhr in view of Günther, be reconsidered and withdrawn.

The rejection of claims 2-4 under 35 U.S.C. § 103(a), as being unpatentable over Yager in view of Kennedy, is respectfully traversed based on the following.

Claims 2-4 depend from claim 1. As discussed above, Yager fails to disclose or suggest at least two limitations of claim 1. The combination of Yager and Kennedy similarly fails to disclose or suggest each limitation of claim 1. Kennedy includes numerous electrodes, but none are disclosed as being in the configuration required by claim 1, one of the same shortcomings of Yager. Kennedy's electrodes are positioned within the various reservoirs and are not at least partially opposite each other as seen in Fig. 5 and described at column 6, lines 5, 6. Kennedy, at column 7, lines 34-36, discloses "an optical detection window fabricated across one of the plurality of channels within the device." As Kennedy's electrodes are located in the reservoirs, they are not "provided to face said channel at a vicinity of said optical element," a requirement of claim 1.

Furthermore, Kennedy's electrode configuration is designed for pumping an object from one reservoir to another as noted at column 6, lines 29-38. This pumping action thus approximates an object in a direction parallel to the length of the channel, not transverse as

required by claim 1. Thus, the combination of Yager and Kennedy fails to disclose or suggest several limitations of claim 1 and cannot render the apparatus of claim 1 obvious. Claims 2-4 depend from nonobvious claim 1 and are nonobvious for at least the same reasons.

Accordingly, it is respectfully requested that the rejection of claims 2-4 under 35 U.S.C. § 103(a) as being unpatentable over Yager in view of Kennedy, be reconsidered and withdrawn.

The rejection of claims 2-4 under 35 U.S.C. § 103(a), as being unpatentable over Yager in view of Manz and Kricka, is respectfully traversed based on the following.

As discussed above, Yager fails to disclose or suggest at least two limitations of claim 1. The combination of Yager, Manz, and Kricka similarly fails to disclose or suggest each limitation of claim 1. Manz does not disclose any electrodes, and therefore cannot disclose or suggest the electrode configuration required by claim 1. Without any electrodes, Manz cannot disclose or suggest approximating an object in a direction transverse to the length of the channel, another requirement of claim 1. Kricka similarly does not disclose any electrodes, and therefore cannot disclose or suggest the required electrode configuration. Without any electrodes, Kricka likewise cannot disclose or suggest approximating an object in a direction transverse to the length of the channel. Because neither Manz nor Kricka disclose electrodes, neither can disclose nor suggest an electrode "provided to face said channel at a vicinity of said optical element." Thus, the combination of Yager, Manz, and Kricka fails to disclose or suggest several limitations of claim 1 and cannot render the apparatus of claim 1 obvious. Claims 2-4 depend from nonobvious claim 1 and are nonobvious for at least the same reasons.

Accordingly, it is respectfully requested that the rejection of claims 2-4 under 35 U.S.C. § 103(a) as being unpatentable over Yager in view of Manz and Kricka, be reconsidered and withdrawn.

The rejection of claim 5 under 35 U.S.C. § 103(a), as being unpatentable over Yager in view of either Weigl or Swerdlow, is respectfully traversed based on the following.

Claim 5 depends from claim 1. As discussed above, Yager fails to disclose or suggest at least two limitations of claim 1. The combination of Yager, Weigl, and Swerdlow similarly fails to disclose or suggest each limitation of claim 1. Weigl, like Manz and Kricka, does not disclose any electrodes, and therefore cannot disclose or suggest the required electrode configuration. Without any electrodes, Weigl cannot disclose or suggest approximating an object in a direction transverse to the length of the channel. While Swerdlow discloses samples being “injected” at a given electric field, there is no disclosure regarding the electrode configuration that generated this electric field. Because Swerdlow does not disclose or suggest the electrode configuration, there can be no disclosure that the electrodes will approximate an object in a direction transverse to the length of the channel. Thus, the combination of Yager, Weigl, and Swerdlow fails to disclose or suggest several limitations of claim 1 and cannot render the apparatus of claim 1 obvious. Claim 5 depends from nonobvious claim 1 and is nonobvious for at least the same reasons.

Accordingly, it is respectfully requested that the rejection of claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Yager in view of either Weigl or Swerdlow, be reconsidered and withdrawn.

The rejection of claim 8 under 35 U.S.C. § 103(a), as being unpatentable over Yager in view of Manz, is respectfully traversed based on the following.

Claim 8 depends from claim 1. As discussed above, the combination of Yager and Manz fails to disclose or suggest at least two limitations of claim 1 and therefore cannot render the apparatus of claim 1 obvious. Claim 8 depends from nonobvious claim 1 and is nonobvious for at least the same reasons.

Accordingly, it is respectfully requested that the rejection of claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Yager in view of Manz, be reconsidered and withdrawn.

CONCLUSION

Wherefore, in view of the foregoing amendments and remarks, this application is considered to be in condition for allowance, and an early reconsideration and a Notice of Allowance are earnestly solicited.

This Amendment increases the number of independent claims by one from eight to nine and increases the total number of claims by three from 28 to 31, but does not present any multiple dependency claims. Accordingly, a Response Transmittal and Fee Authorization form authorizing the amount of \$250.00 to be charged to Sidley Austin LLP Deposit Account No. 18-1260 is enclosed herewith in duplicate. However, if the Response Transmittal and Fee Authorization form is missing, insufficient, or otherwise inadequate, or if a fee, other than the issue fee, is required during the pendency of this application, please charge such fee to Sidley Austin LLP Deposit Account No. 18-1260.

If an extension of time is required to enable this document to be timely filed and there is no separate Petition for Extension of Time filed herewith, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for a period of time sufficient to enable this document to be timely filed.

Any other fee required for such Petition for Extension of Time and any other fee required by this document pursuant to 37 C.F.R. §§ 1.16 and 1.17, other than the issue fee,

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and not submitted herewith should be charged to Sidley Austin LLP Deposit Account
No. 18-1260. Any refund should be credited to the same account.

Respectfully submitted,

By: Mark A. Dodd
Mark A. Dodd
Registration No. 45,729
Attorney for Applicant

MAD/llb:bar
SIDLEY AUSTIN LLP
717 N. Harwood, Suite 3400
Dallas, Texas 75201
Direct: (214) 981-3481
Main: (214) 981-3300
Facsimile: (214) 981-3400
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